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Vulnerability of Borderland Water Resources: Developing Indicators for Selected Watersheds on the U.S. Mexico Border - The Paso del Norte Region

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Vulnerability of Borderland Water Resources: Developing Indicators for Selected Watersheds on the U.S. Mexico Border – The Paso del Norte Region

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Both urban areas and natural ecosystems along the U.S.-Mexico border are experiencing water stress; water resources are often not available in the quantity and quality needed, and the future is likely to see even greater water stress in both environments. In this research, we assess the vulnerability of water resources along the U.S.-Mexico border employing methods and approaches used previously by Hurd et al. (1998 and 1999) to examine the vulnerability of watersheds at a national scale as a result of climate change. In our research, we refine and expand upon this work by exploring water resources at a greater spatial resolution using a combination of watershed analysis and groundwater analysis, focusing specifically on a sub-basin of the Rio Grande/Rio Bravo Basin.

A binational research team at New Mexico State University (NMSU) and la Universidad Autónoma de Cuidad Juárez (UACJ) has examined the existing literature, information needs, and available data in an effort to develop indicators of watershed and water resources vulnerability. This process is enhanced through the involvement of a binational panel of experts. The selected experts, drawn from a variety of water resource fields in the U.S. and Mexico, have assisted the NMSU/UACJ research team in assessing, identifying, and refining potential indicators and border-specific information needs. In the Experts Panel, we identified numerous sources of vulnerability to surface water and groundwater resources, outlined a process to develop a series of indicators by which to monitor these vulnerabilities, and detailed the spatial data sources we would need to capture to build these indicators.

The next steps in the project are to use a geographic information system (GIS) analytical framework to delineate watersheds of interest in the Paso del Norte region using the Pfafstetter (1989) approach that has been previously employed in a GIS framework by Verdin and Verdin (1999). These sub-basins of interest are then merged with aquifers of regional importance to generate an "anthropogenic hydrosphere of interest" within which subsequent analysis is undertaken. The spatial data detailed in the Experts Panel are aggregated into a series of spatially referenced indicators of water resource vulnerability that reflect the sources of vulnerability identified previously.

The outcome of this GIS work is a series of GIS maps that assess the vulnerability of water resources and watersheds in our area of investigation. In addition to the actual assessment of watershed vulnerability in our study area, important outcomes of this work include a refined methodology for vulnerability assessment that will be portable to other

border watersheds of interest, the generation of baseline datasets on which additional research can be conducted, the identification of critical areas of concern, and a set of policy recommendations that focus on these areas of concern.

References

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